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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* TIMOTHY J. FULLER,  
DAMODAR M. PAI, JOHN F. YANUS,  
MARKUS R. SILVESTRI, KENNY-TUAN T. DINH, and  
YUHUA TONG

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Appeal 2009-005820  
Application 10/808,679  
Technology Center 1700

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Decided: June 4, 2010

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Before CHUNG K. PAK, TERRY J. OWENS, and MARK NAGUMO,  
*Administrative Patent Judges.*

NAGUMO, *Administrative Patent Judge.*

DECISION ON APPEAL

A. Introduction<sup>1</sup>

Timothy J. Fuller, Damodar M. Pai, John F. Yanus, Markus R. Silvestri, Kenny-Tuan T. Dinh, and Yuhua Tong (“Xerox”) timely appeal under 35 U.S.C. § 134(a) from the final rejection<sup>2</sup> of claims 1, 5-16, and 20-32, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6. We REVERSE.

The subject matter on appeal relates to processes of preparing poly(vinylbenzyl alcohol) by base-catalyzed hydrolysis of poly(vinylbenzyl acetate) in pyridine. Prior art methods of preparing poly(vinylbenzyl alcohol) are said to give low yields and to be expensive and difficult to scale up.

Representative Claim 1 is reproduced from the Claims Appendix to the Principal Brief on Appeal:

1. A process for preparing poly(vinylbenzyl alcohol) comprising:

preparing a reaction mixture comprising  
poly(vinylbenzyl acetate),  
a basic catalyst, and  
pyridine; and

hydrolyzing the poly(vinylbenzyl acetate) in the presence  
of the basic catalyst to form poly(vinylbenzyl alcohol).

(Claims App., Br. 8; paragraphing and indentation added.)

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<sup>1</sup> Application 10/808,679, *Polymer Process*, filed 25 March 2004. The specification is referred to as the “679 Specification,” and is cited as “Spec.” The real party in interest is listed as Xerox Corporation. (Appeal Brief, filed 26 July 2007 (“Br.”), 1.)

<sup>2</sup> Office action mailed 23 February 2007 (“Final Rejection”; cited as “FR”).

The Examiner has maintained the following grounds of rejection:<sup>3</sup>

A. Claims 1, 5-12, 16, 20-27, and 30-32 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller<sup>4</sup> and Deubzer.<sup>5</sup>

B. Claims 1, 5-14, 16, 20-22, and 28-32 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller and Pinschmidt.<sup>6</sup>

C. Claims 1, 5-12, 16, 20-22, and 30-32 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller and Sato.<sup>7</sup>

B. Discussion

Findings of fact throughout this Opinion are supported by a preponderance of the evidence of record.

The Examiner finds that Fuller teaches the hydrolysis of poly(vinylbenzyl acetate) in the presence of a basic catalyst (borane-tetrahydrofuran) (Ans. 7, last para.) and a solvent (THF) (*id.* at 8, 2d para.). The Examiner also finds that Fuller does not teach or suggest the use of pyridine as the solvent for the reaction. (*Id.* at 9, 4th para.)

The Examiner finds further that Deubzer discloses “conventional basic catalysts in any hydrolysis reaction.” (*Id.* at 8, 1st para.) The

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<sup>3</sup> Examiner’s Answer mailed 28 September 2007. (“Ans.”).

<sup>4</sup> Timothy J. Fuller et al., *Photoreceptor with Poly(Vinylbenzyl Alcohol)*, U.S. Patent 6,200,716 B1 (2001).

<sup>5</sup> Bernward Deubzer and Jochen Dauth, U.S. Patent 6,251,313 B1 (2001).

<sup>6</sup> Robert Krantz Pinschmidt, Jr. and Khalil Yacoub, U.S. Patent 6,391,992 B1 (2002).

<sup>7</sup> Toshiaki Sato et al., U.S. Patent 5,710,211 (1998).

Examiner concludes that it would have been obvious to use basic catalysts taught by Deubzer in the process taught by Fuller. (*Id.*, 3d para.)

The Examiner finds that Pinschmidt teaches that hydrolysis reactions of vinylacetate polymers to vinylalcohol polymers are “conducted in the presence of a solvent/catalyst,” including sodium hydroxide and methoxide. (Ans. 9, 1st para.) The Examiner does not cite any portion of Pinschmidt in the rejection stated in either the Final Rejection or the Answer. The Examiner concludes it would have been obvious to use the catalysts/solvents taught by Pinschmidt as the basic catalysts “to prepare the material of Fuller . . . with reasonable expectation of preparing a material having decreased coating defects.” (*Id.*, 2d para.)

The Examiner finds that Sato discloses processes for producing vinyl alcohol-type polymers, and that “suitable bases/solvents” for such processes include pyridine. (Ans. 9, 5th para.) The Examiner does not cite any portion of Sato in the rejection stated in either the Final Rejection or the Answer. The Examiner concludes it would have been obvious to use the “bases/solvents” taught by Sato “as the basic catalysts with reasonable expectation of preparing a material having decreased coating defects.” (*Id.*, 6th para.)

The dispositive argument raised by Xerox is that the Examiner erred in finding that Fuller teaches a basic catalyst, because borane-tetrahydrofuran is an acidic catalyst. (Br. 3.) Borane— $\text{BH}_3$ —is a Lewis acid. The stated basis of the Examiner’s argument for obviousness in each rejection, that it would have been obvious to substitute one basic catalyst for another, is thus based on a faulty premise. This suffices as grounds for

reversal in as much as the Examiner has not explained why a person having ordinary skill in the art would have looked to the other references, which teach base-catalyzed hydrolysis of vinyl polymers having ester side-groups, to modify the acid-driven transformation taught by Fuller.

There are further flaws in the rejections. Xerox argues that Deubzer teaches basic hydrolysis reactions in which the solvents should not be water-miscible. (*Id.* at 5, 2d full para., citing Deubzer, col. 3, ll. 55-65.) On the other hand, Xerox argues, the solvents used by Fuller include water, methanol, and THF, which are all water-miscible. (Br. 5.) Xerox concludes that Deubzer teaches away from using basic catalysts in the process of Fuller. (*Id.*) The Examiner has not explained why a person of ordinary skill in the art would have looked to the teachings of Deubzer to modify the process taught by Fuller when the reaction chemistries are so different.

Xerox argues that the Examiner erred in finding that Sato teaches pyridine as a solvent because Sato actually teaches pyridine “as a catalyst between two specific reactants.” (Br. 6, last para., emphasis not reproduced; citing Sato, col. 4, ll. 57-62 (listing solvents, but not pyridine) and col. 5, ll. 4-14, (listing pyridine as a reaction catalyst)). Neither reactant, Xerox argues, is similar, in a way relevant to the rejection, to poly(vinylbenzyl acetate). (Br. 6, last para.) Review of the cited portions of Sato indicates that Xerox’s characterizations are accurate. Sato describes a reaction between a vinyl ester polymer (A) having an epoxy group with a compound (B) having a thiol or thio ester group. The Examiner has not explained the relevance of such a reaction to the reaction taught by Fuller. Moreover, the Examiner’s argument that it would have been obvious to use

pyridine as a solvent for the reaction taught by Fuller fails for lack of evidentiary support regarding pyridine as a solvent for any reaction.

The Examiner appears to have concluded that, because the general transformation under basic catalysis of poly(vinyl esters) to poly(vinyl alcohols) in solvents is known, as discussed by Pinschmidt at column 8, lines 13-51, the claimed transformation of poly(vinylbenzyl acetate) to poly(vinylbenzyl alcohol) by base-catalyzed hydrolysis in the solvent pyridine would have been obvious. In this regard, Pinschmidt is perhaps the closest evidence of record. The Examiner has not explained, however, why a person having ordinary skill in the art would have modified the acid-driven processes taught by Fuller in light of the general processes taught by Pinschmidt. Nor has the Examiner explained why it would have been obvious to use pyridine as the solvent in such a reaction.

Put more generally, the Examiner failed to establish obviousness because the Examiner failed to identify clearly the processes taught by the references, and the Examiner failed to identify clearly the differences between those processes and the process covered by the claims. In the absence of the requisite foundational analysis, the failure of the obviousness inquiry is not unexpected.

C. Order

We REVERSE the rejection of claims 1, 5-12, 16, 20-27, and 30-32 under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller and Deubzer.

We REVERSE the rejection of claims 1, 5-14, 16, 20-22, and 28-32 under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller and Pinschmidt.

We REVERSE the rejection of claims 1, 5-12, 16, 20-22, and 30-32 under 35 U.S.C. § 103(a) in view of the combined teachings of Fuller and Sato.

REVERSED

tc

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